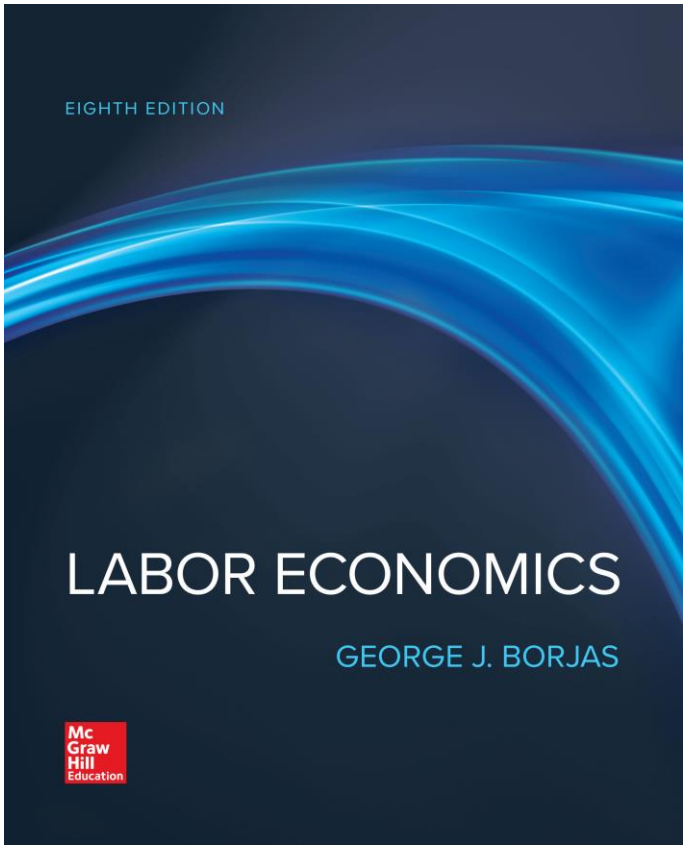
# Chapter 5

## Compensating Wage Differentials



"It's just a job. Grass grows, birds fly, waves pound the sand. I beat people up."
-Muhammad Ali

# Introduction

The labor market is not characterized by a single wage: workers differ and jobs differ.

Adam Smith proposed the idea that job characteristics influence labor market equilibrium.

Compensating wage differentials arise to compensate workers for nonwage characteristics of the job.

Workers have different preferences and firms offer different working conditions.

# The Market for Risky Jobs

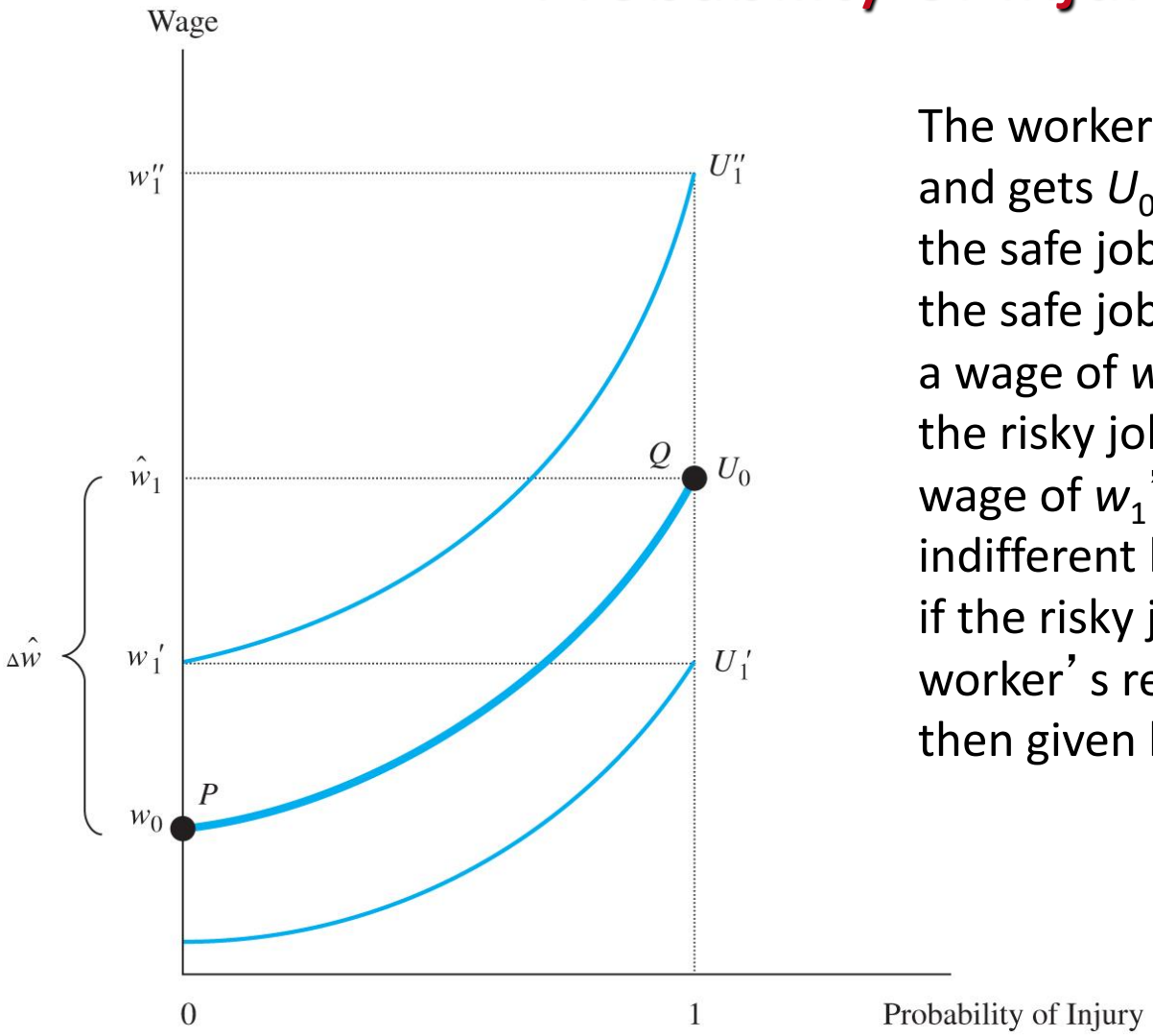
Workers care about whether their job is safe or risky.

Utility = f(wage, risk of injury).

Indifference curves reveal the worker's preferences between wages and risk.

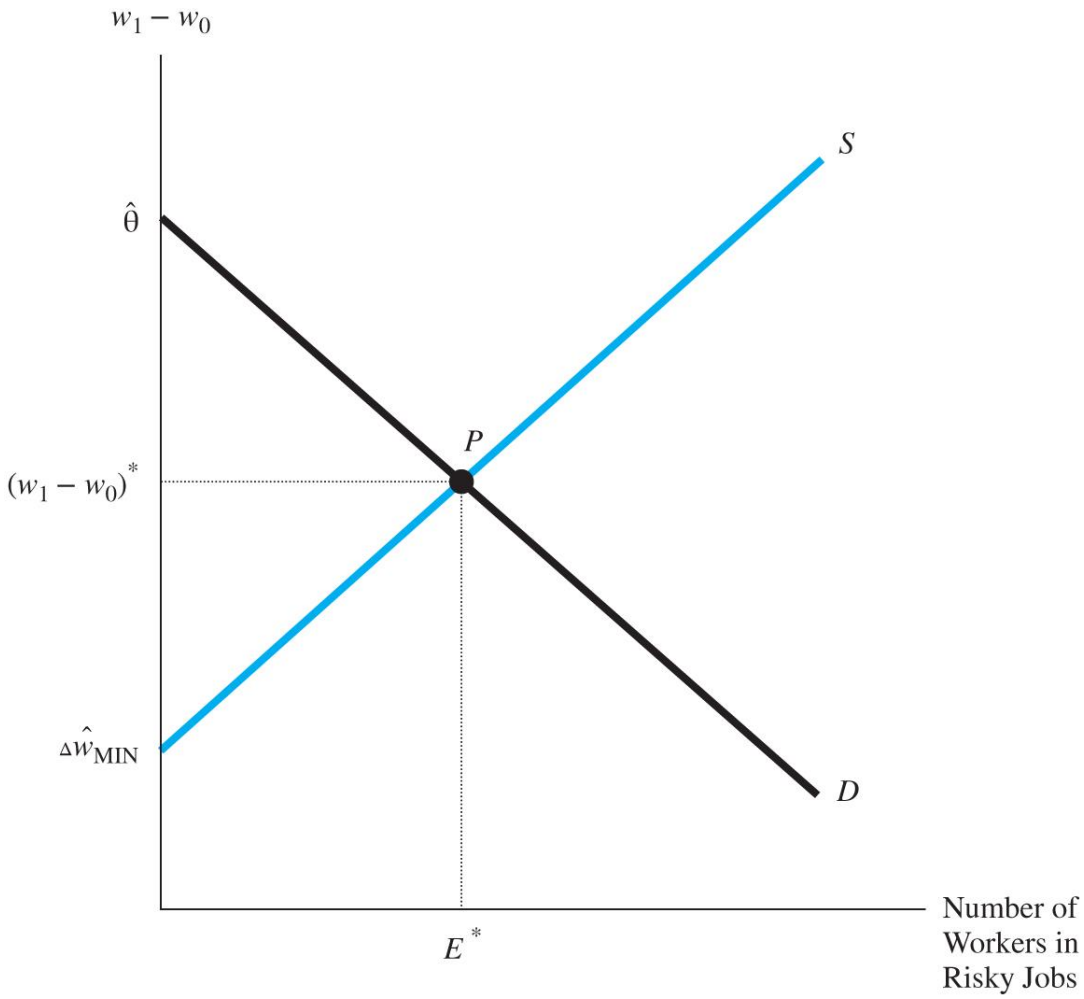
Firms may have a risky work environment because it is less expensive to pay higher wages than to make the environment safe.

# Indifference Curves Relating the Wage and the Probability of Injury



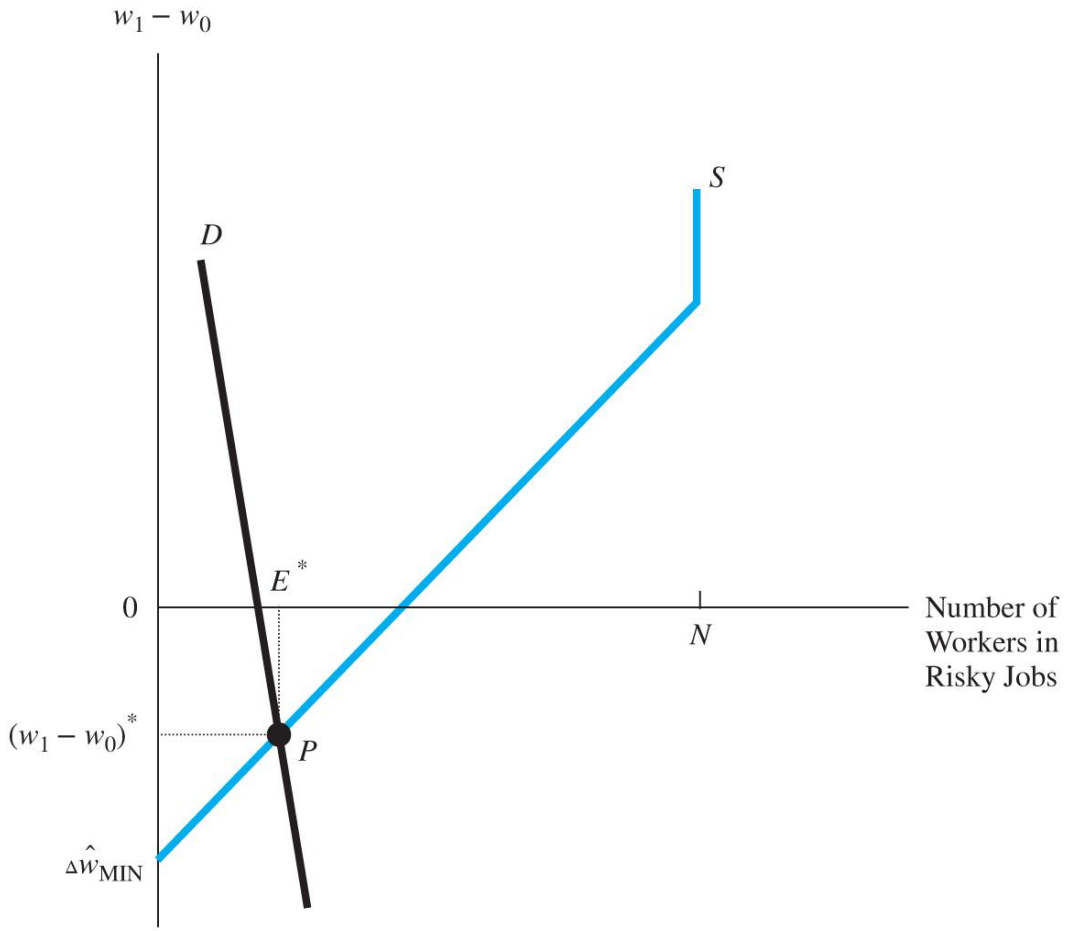

The worker earns a wage of $w_0$ and gets $U_0$ utils if she chooses the safe job. She would prefer the safe job if the risky job paid a wage of $w_1'$, but would prefer the risky job if that job paid a wage of $w_1''$. The worker is indifferent between the two jobs if the risky job pays w^$_1$. The worker's reservation price is then given by $\Delta w = w^_1 - w_0$.

# Determining the Market Compensating Differential




The supply of labor to risky jobs slopes up because as the wage gap between the risky job and the safe job increases, more and more workers are willing to work in the risky job. The demand curve slopes down because fewer firms will offer risky working conditions if risky firms have to offer high wages to attract workers. The market compensation differential equates supply and demand, and gives the "bribe" required to attract the last worker hired by risky firms.

# Market Equilibrium When Some Workers Prefer Risky Jobs




If some workers like to work in risky jobs (i.e., they are willing to pay for the right to be injured) and if the demand for such workers is small, then the market compensating differential is negative. At point *P*, where supply equals demand, workers employed in risky jobs earn less than workers employed in safe jobs.

# Hedonic Wage Theory

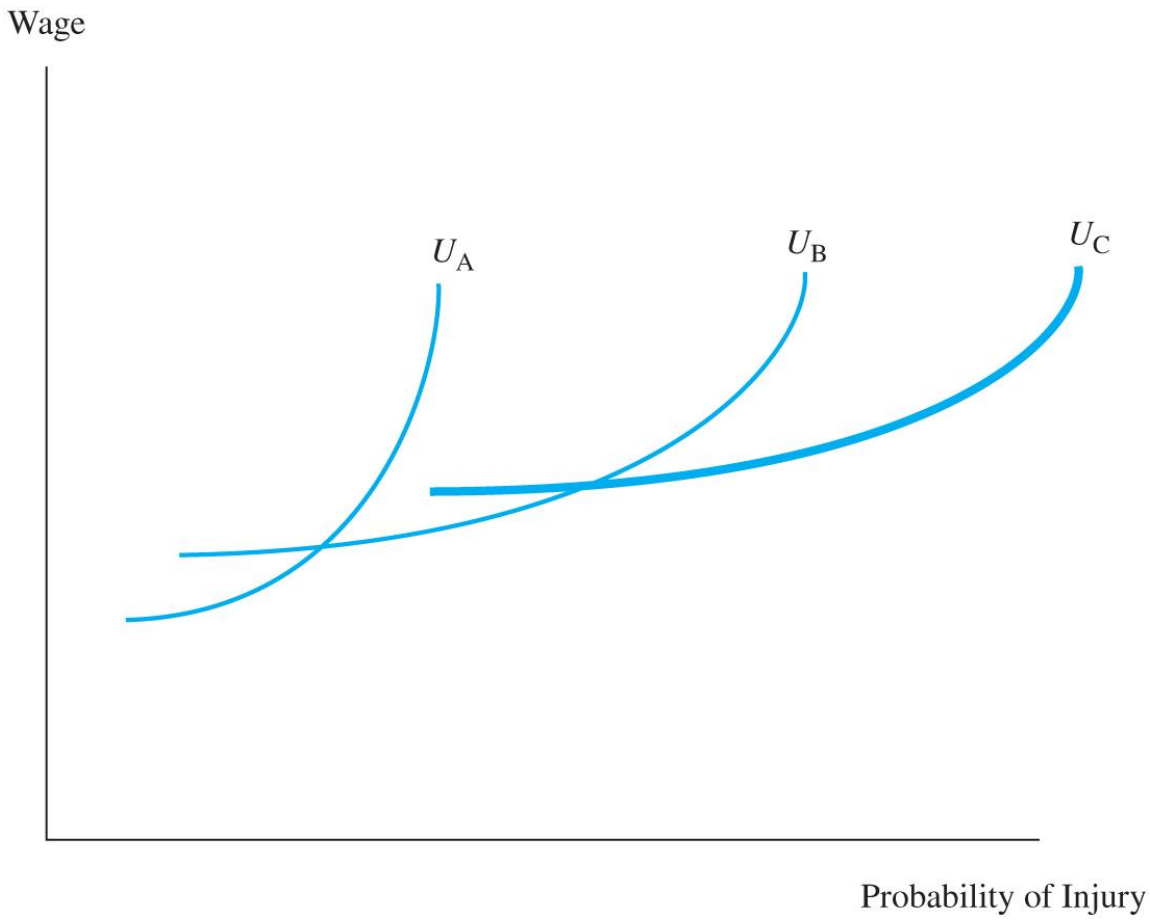
Workers maximize utility by choosing wage-risk combinations that offer them the greatest amount of utility.

Isoprofit curves are upward sloping because production of safety is costly.

Isoprofit curves are concave because production of safety is subject to the law of diminishing returns.

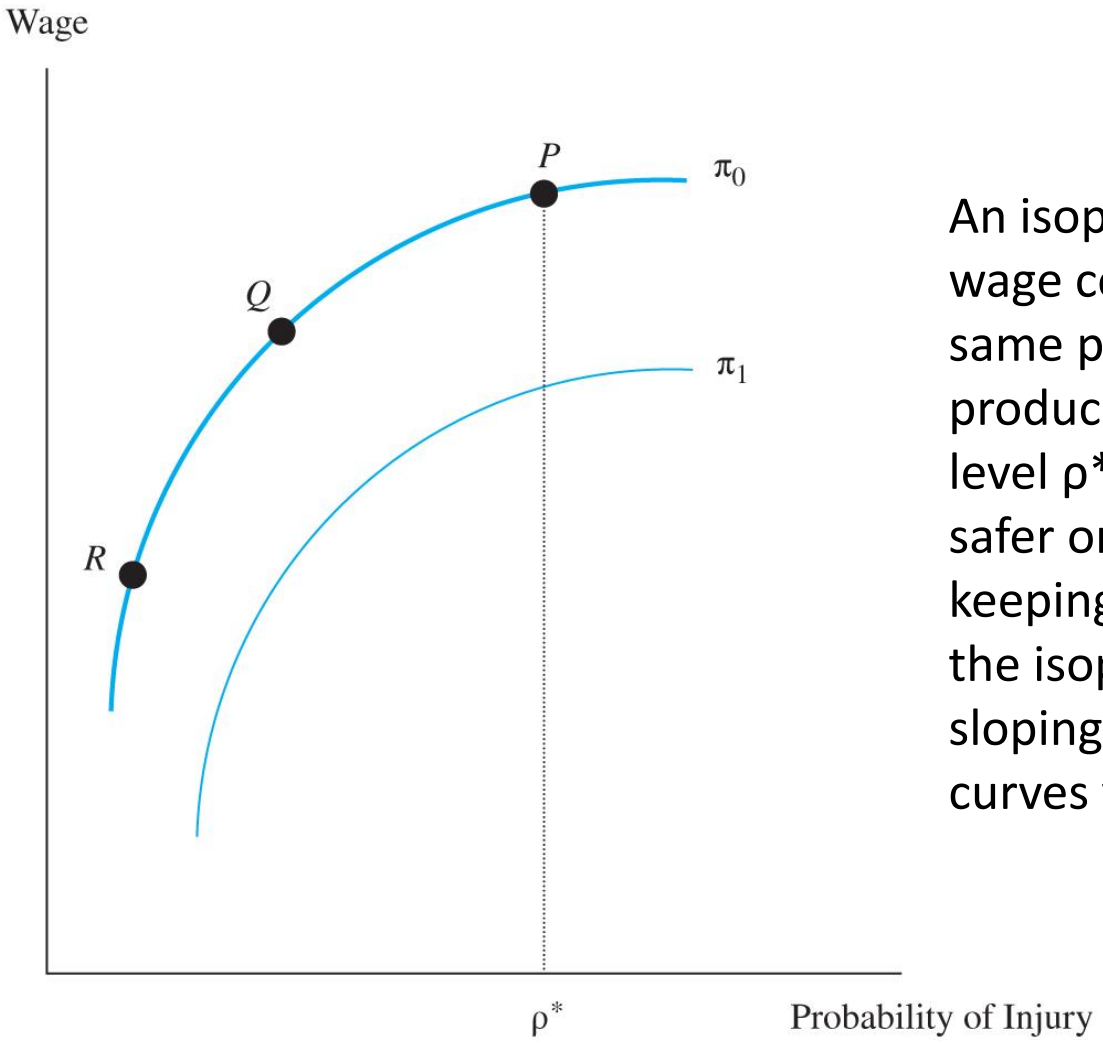
Hedonic wage functions reflect the relationship between wages and job characteristics.

# Indifference Curves for Three Types of Workers



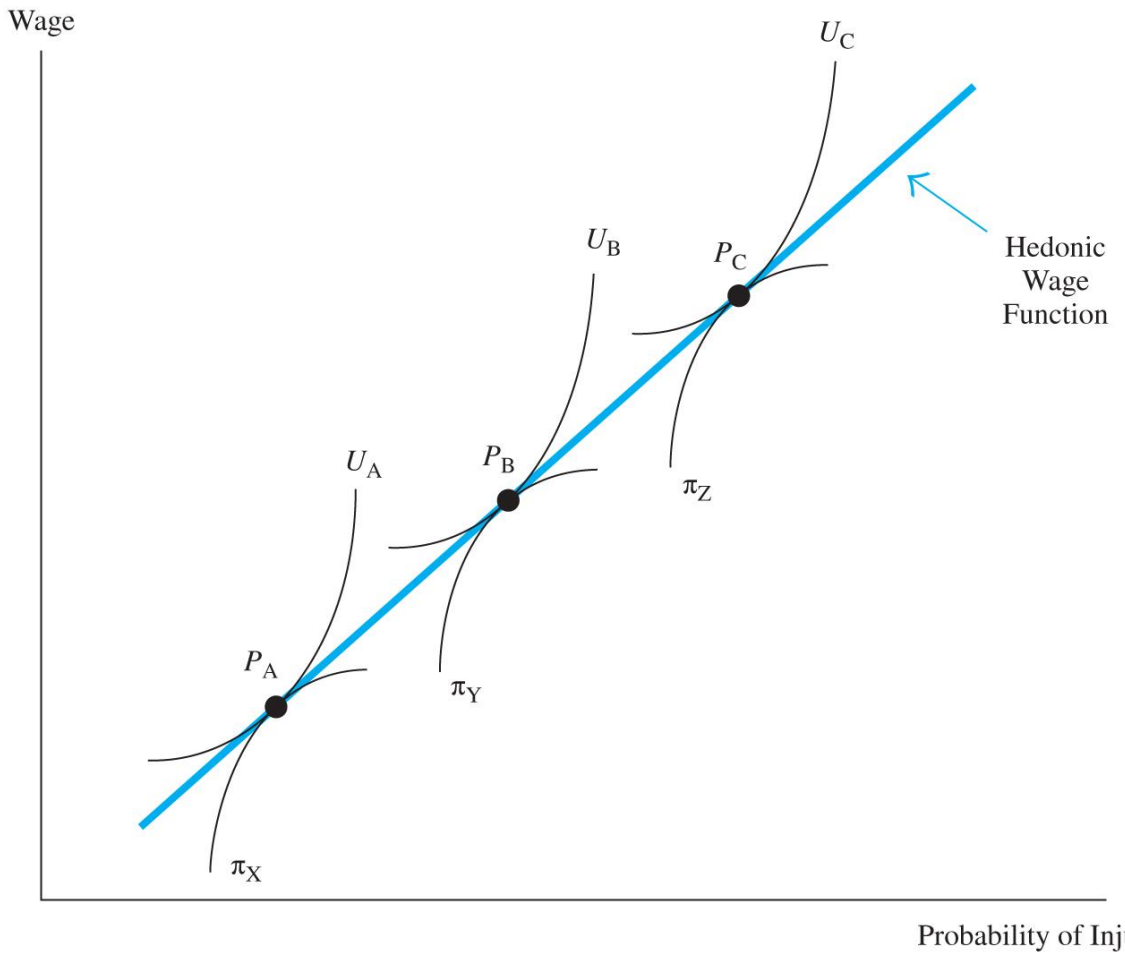

Different workers have different preferences for risk. Worker *A* is very risk-averse. Worker *C* does not mind risk very much at all. Worker B is between the two.

# Isoprofit Curves




An isoprofit curve gives all the risk-wage combinations that yield the same profits. Because it is costly to produce safety, a firm offering risk level ρ* can make the workplace safer only if it reduces wages (while keeping profits constant), so that the isoprofit curve is upward sloping. Note: higher isoprofit curves yield lower profits.

# The Hedonic Wage Function




Different firms have different isoprofit curves and different workers have different indifference curves. The labor market marries workers who dislike risk (such as worker *A*) with firms that find it easy to provide a safe environment (like firm *X*); and workers who do not mind risk very much (worker *C*) with firms that find it difficult to provide a safe environment (firm *Z*). The observed relationship between wages and job characteristics is called a hedonic wage function.

# Policy Application: How Much is a Life Worth?

Studies report a positive relationship between wages and work hazards.

The statistical value of life is the amount that workers are jointly willing to pay to reduce the likelihood that one of them will suffer a fatal injury in a given year on the job.

The empirical evidence is ambiguous on the estimates of the value of a life.

# Policy Application: How Much is a Life Worth?

Calculating the Value of Life (VoL)

$w_x$ = annual earnings in Firm X

$w_y$ = annual earnings in Firm Y

The probabilities of fatal injury in Firm X and Firm Y are given as $\rho_x$ and $\rho_y$.

If X is a safe job and Y is the risky job, then:

- $VoL = (w_y - w_x) / (\rho_y - \rho_x)$

# Policy Application: Safety and Health Regulation

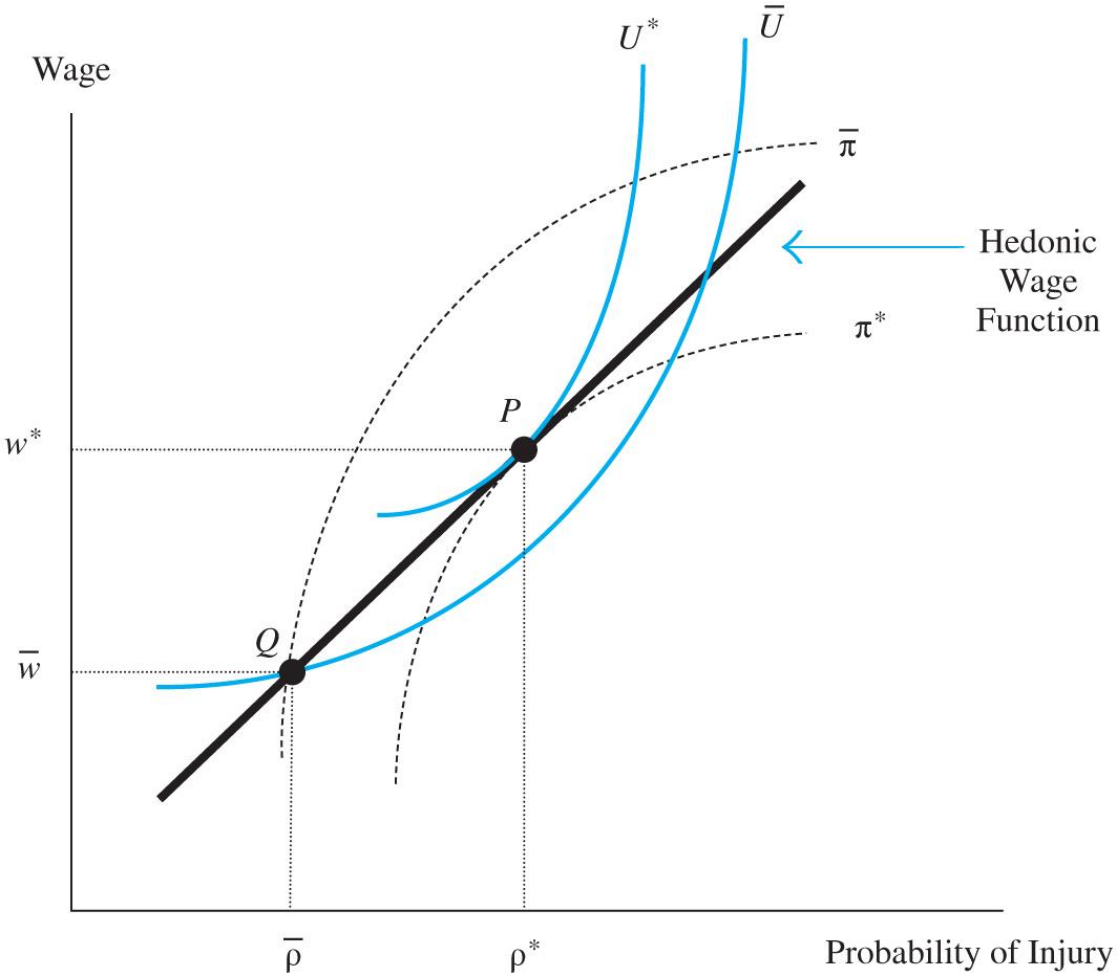
OSHA is charged with the protection and health of the American labor force.

OSHA sets regulations that are aimed at reducing risks in the work environment.

Mandated standards reduce the utility of workers and the profits of firms.

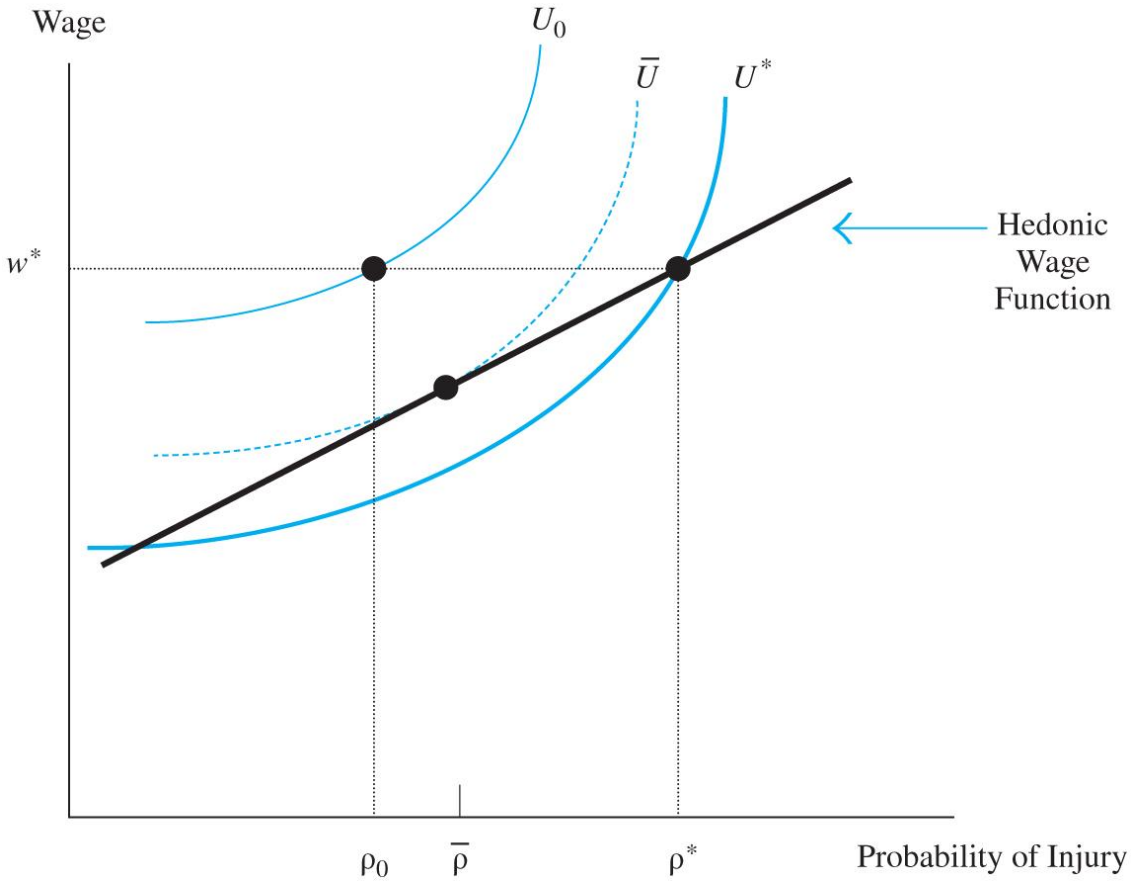
Safety regulations can improve workers' welfare as long as workers consistently underestimate the true risks.

# Impact of OSHA Regulation on Wage, Profits, and Utility




A worker maximizes utility by choosing the job at point *P*, which pays a wage of $w^*$ and offers a probability of injury of $\rho^*$. The government prohibits firms from offering a probability of injury higher than $\rho^-$, shifting both the worker and the firm to point *Q*. As a result, the worker earns a lower wage and receives less utility (from $U^*$ to $U^-$), and the firm earns lower profits (from $\pi^*$ to $\pi^-$).

# Impact of OSHA Regulations When Workers Misperceive Risks




Workers earn a wage of $w^*$ and incorrectly believe that their probability of injury is only $\rho_0$. In fact, their probability of injury is $\rho^*$. The government can mandate that firms do not offer a probability of injury higher than $\rho^-$, making the uninformed workers better off (that is, increasing their actual utility from $U^*$ to $U^-$).

# Compensating Differentials and Job Amenities

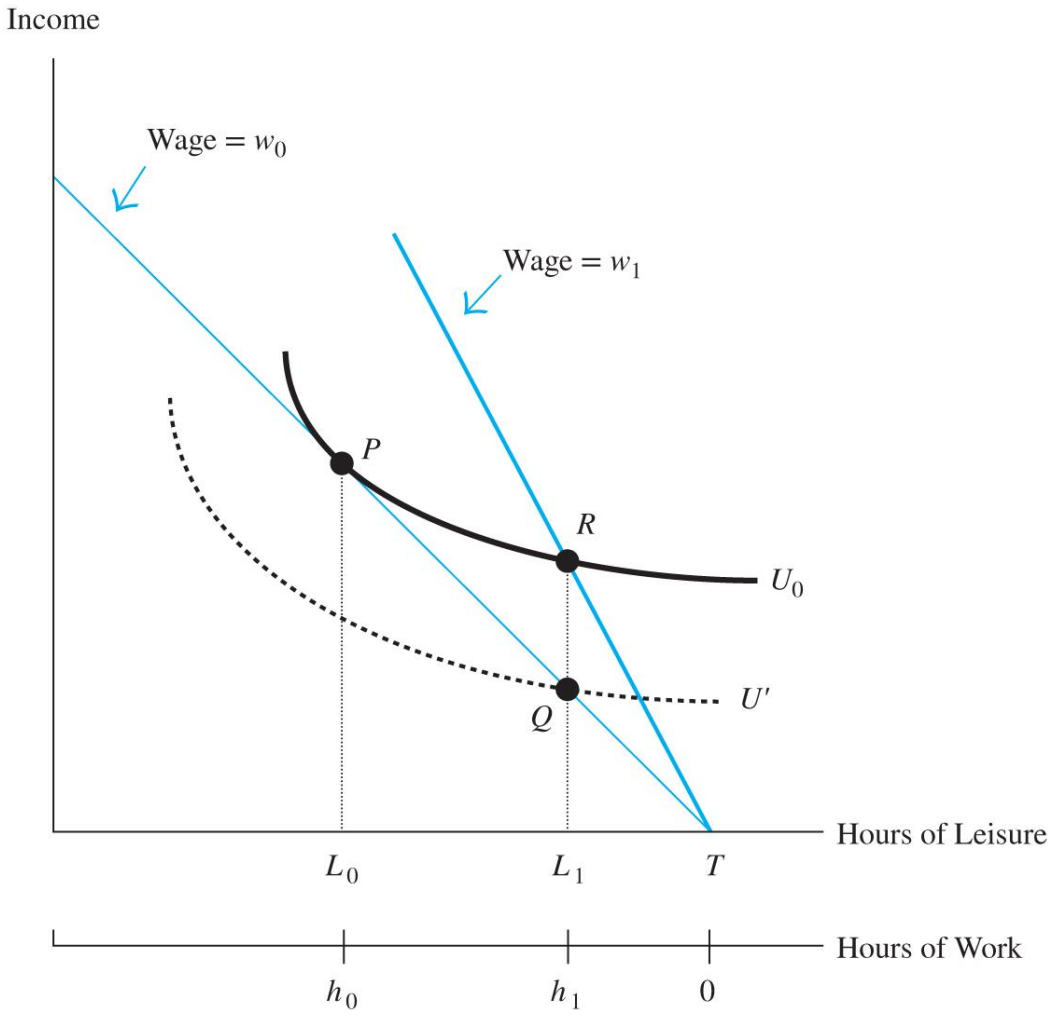
Good job characteristics are associated with low wage rates.

Bad job characteristics are associated with high wage rates.

- The evidence is not clear on the link between amenities and wage differentials, except for the risk of death.

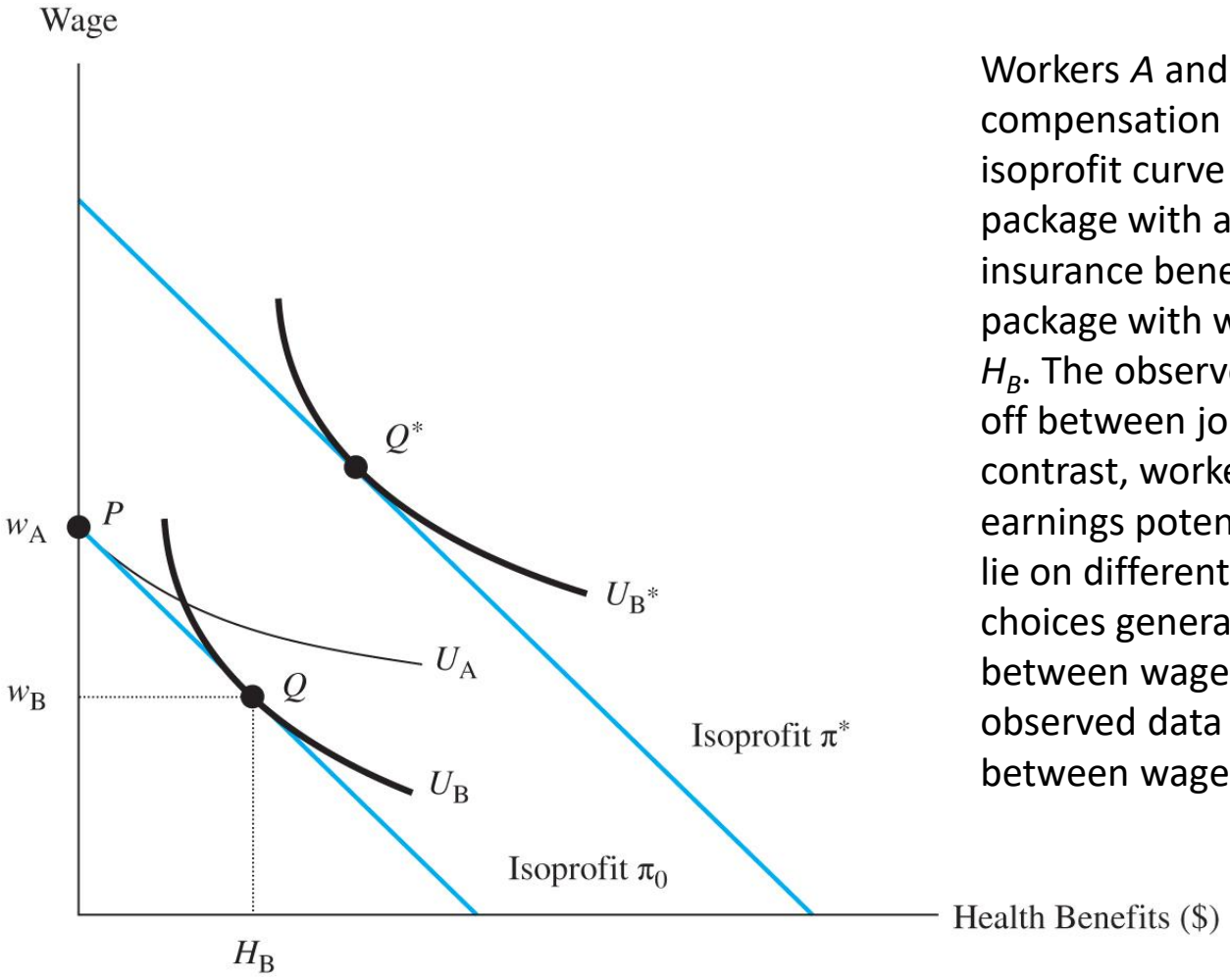
Examples of amenities: job security, predictability of layoffs, work schedules, work hours, safety, etc.

# Layoffs and Compensating Differentials




At point *P*, a person maximizes utility by working $h_0$ hours at a wage of $w_0$ dollars. An alternative job offers the worker a seasonal schedule, where she receives the same wage but works only $h_1$ hours. The worker is worse off in the seasonal job (her utility declines from $U_0$ to $U'$ utils). If the seasonal job is to attract any workers, the job must raise the wage to ($w_1$) so that workers will be indifferent between the two jobs.

# Health Benefits and Compensating Differentials




Workers *A* and *B* face the various compensation packages offered by isoprofit curve $\pi_0$. Worker *A* chooses a package with a high wage and no health insurance benefits. Worker *B* chooses a package with wage $w_B$ and health benefits $H_B$. The observed data identifies the trade-off between job benefits and wages. In contrast, workers *B* and *B** have different earnings potential, so their job packages lie on different isoprofit curves. Their choices generate a positive correlation between wages and health benefits. The observed data do not identify the trade-off between wages and health benefits.